Incidence and outcome of intracranial malignant germ cell tumours diagnosed in western Denmark in the last decade

Lassen-Ramshad, Yasmin; Mikkelsen, Torben Stamm; Rosthoej, Steen; Henriksen, Louise Tram; Tuckuvienne, Ruta; Kristensen, Ines Ackerl; von Oettingen, Gorm; Cortnum, Soeren; Als, Anne-Birgitte; Safwat, Akmal; Agerbaek, Mads

Published in:
Neuro-Oncology

DOI (link to publication from Publisher):
10.1093/neuonc/noaa222.282

Publication date:
2020

Document Version
Publisher's PDF, also known as Version of record

[11]Department of Neurosurgery, Faculty of Medicine, University of Tsukuba, Tsukuba, Ibaraki, Japan, [12]Department of Neurosurgery, Graduate School of Medicine, Yokohama City University, Yokohama, Kanagawa, Japan, [13]Department of Pathology, Hyogo Prefectural Kobe Children's Hospital, Kobe, Hyogo, Japan, [14]Department of Neurosurgery, Hyogo Prefectural Kobe Children's Hospital, Kobe, Hyogo, Japan, [15]Department of Hematology/Oncology, Saitama Children's Medical Center, Saitama, Japan, [16]Department of Neurosurgery, Saitama Children's Medical Center, Saitama, Japan, [17]Department of Neurosurgery, Kyorin University Faculty of Medicine, Mitaka, Tokyo, Japan, [18]Department of Neurosurgery, Faculty of Medicine, The University of Tokyo, Bunkyo-ku, Tokyo, Japan

BACKGROUND: Central nervous system germ cell tumor (CNSGCT) is a rare pediatric brain tumor. However, they are found at a relatively high incidence in East Asia. Germinoma is sensitive toward radiotherapy and chemotherapy; however, non-germinoma GCTs (NGGCT) often show poor response. Some cases are a mixture of germinoma and NGGCT (mixed GCT), and they sometimes change histological subtypes at recurrence. Previous report demonstrated that a germinoma and NGGCT component within the same mixed GCT tissue shared the same gene mutation, whereas the genome-wide methylation profiles were distinct from each other. The methylation profiles of germinoma was similar to the primordial germ cells (PGC) at the migration phase, supporting a model that PGC is the cell of origin for CNSGCT. However, tumor heterogeneity hinder information of the mixed bulk RNA-sequence data, causing difficulty in elucidating the mechanism of tumor development. The purpose of this study was to investigate the tumor cells subpopulations at the resolution of individual cells by single-cell RNA-seq. RESULTS: Fresh surgical tumor tissue was immediately dissociated mechanically and enzymatically. Tumor cells are separated from CD45-labelled lymphocytes by FACS, and libraries were generated by Chromium Single cell 3' Reagent Kit. Total of 11 tumor samples were collected and sequenced. Unsupervised Clustering showed individual clusters. One of the clusters had high expression of Oct-4, which is a marker of germinoma. The other clusters showed different subtypes of cells representing the heterogeneity of CNSGCT. Further analysis including a pseudo-time course analysis is underway to identify the lineage of tumor cell development.

GCT-63. STEREOTACTIC RADIOSURGERY FOR RESIDUAL LESIONS OF PINEAL NON-GERMINOMATOUS GERM CELL TUMORS AFTER CONVENTIONAL RADIOTHERAPY: A RETROSPECTIVE STUDY

Mingyao Lai, Juan Li, Qingjun Hu, Zhaoming Zhou, Lei Wen, Cheng Zhou, Changguo Shan, and Linbo Cai; Guangdong Sanjiu Brain Hospital, Guangzhou, Guangdong, China

OBJECTIVE: To explore the efficacy and safety of SRS for residual lesions of NGGCTs after conventional RT. METHODS: The clinical data of patients with iGCT who were admitted to Department of Oncology, Guangdong Sanjiu Brain Hospital between January 1, 2008 and December 30, 2019 were gathered. Those who were pathologically or clinically diagnosed with NGGCTs, with lesions located at pineal region, limited stage and residual lesions (with a maximum diameter>10mm) of pineal NGGCTs after RT with a total dose of 50-54Gy/25-30f, were eligible for the study. Several indexes such as local control rate, PFS, OS and treatment-related toxicity were analyzed. RESULTS: A total of 27 patients were included; all were male, with a median age of 16 years (range 8–31 years). The patients were followed-up to December 30, 2019, but there were 2 cases lost to follow-up. The median follow-up time was 34 months (range 8–142 months). After a month of treatment with SRS, the ORR and DCR were 71.4% and 95.2%, respectively. During follow-up, 5 cases had radiographic progressions, including 3 cases combined with increased AFP which were diagnosed with local recurrence and 2 cases diagnosed with GTS ; The 3y-PFS and OS were 85.2% and 88.0%.no acute radiation response was found after treatment with SRS, and only one patient had brain neurotoxicity. CONCLUSION: SRS for residual lesions of NGGCTs after RT is proved to be safe and feasible, with well tolerance, which is beneficial for the improvement of local control and the prolongation of survival.

GCT-64. TREATMENT RESULTS IN CHILDREN WITH LOCALIZED CNS NGGCT

Irina Vilesova[1], Ekaterina Tarasova[2], Andge Valiakhmetova[3], Ekaterina Salnikova[1], Alexey Pshonkin[1], Galina Novichkova[1], Alexander Karachunsky[1], and Ludmila Papusha[1]; [1]Dmitry Rogachev National Medical Research Center Of Pediatric Hematology, Oncology and Immunology, Moscow, Russian Federation, [2]Russian Children's Clinical Hospital, Moscow, Russian Federation, [3]N. N. Burdenko National Medical Research Center of Neurosurgery, Moscow, Russian Federation

BACKGROUND/OBJECTIVES: Treatment of children with CNS NGGCT remains challenge: 5y OS is 60 – 80%; relapses are very aggressive. DESIGN/METHODS: Between 2003 and 2019, 14 children (median age 10.5, range 4 – 16 years) with localized intracranial NGGCT were treated with RT after induction chemotherapy (focal – 4, WVI+boost – 6, WBI+boost – 3, CSI+boost – 1). Tumor markers were elevated in 13 patients: 6 – AFP, 5 – HCG, 2 – both. One patient with level of HCG 72049 IU/l in serum and 121451 IU/l in CSF received 4 cycles of PEI + CSI 30 Gy with boost 54Gy. RESULTS: At a median follow-up of 4,7 years (range 1 – 16,25 years), 12 patients are alive. 5-year PFS and OS are 77,1% and 85,7%, respectively. Two patients (both AFP and HCG) progressed during RT (1 – focal, 1 – WBI+boost), both died. Two patients with high level of HCG recurred after therapy (WVI+boost – 1, focal – 1), both are alive. The first of them at recurrence (mts of lateral ventricle) received 4 cycles of PEI and RT (WBI+boost). The second patient had level of HCG 620IU/l and initially received focal irradiation 54Gy. At recurrence with distant spinal mts he received HD-CHT with auto-SCT, surgical resection of residual tumor and CSI with boost. CONCLUSIONS: Good results of treatment of localized CNS NGGCT with CSI, WBI or WVI in compare with focal RT show advantages of extended irradiation field. CSI should be considered for patients with extremely high levels of tumor markers and respectively poor prognostic histology.

GCT-65. INCIDENCE AND OUTCOME OF INTRACRANIAL MALIGNANT GERM CELL TUMOURS DIAGNOSED IN WESTERN DENMARK IN THE LAST DECADE

Yasmin Lassen-Ramshad[1], Torben Stamm Mikkelsen[2], Steen Rosthoej[3], Louise Tram Henriksen[2], Ruta Tuckuvienne[3], Ines Ackerl Kristensen[2], Gorm von Oettingen[4], Soeren Cortnum[4], Anne-Birgitte Als[5], Akmal Safwat[1,5], and Mads Agerbaek[5]; [1]Danish Centre For Particle Therapy, Aarhus University Hospital, Aarhus, Denmark, [2]Pediatric Department, Aarhus University Hospital, Aarhus, Denmark, [3]Pediatric Department, Aalborg University Hospital, Aalborg, Denmark, [4]Department of Neurosurgery, Aarhus University Hospital, Aarhus, Denmark, [5]Department of Oncology, Aarhus University Hospital, Aarhus, Denmark

INTRODUCTION: Intracranial malignant germ cell tumours (iGCT) are rare brain tumours mainly diagnosed in children and younger adults. MATERIAL AND METHODS: A retrospective analysis was performed by chart review of patients treated for iGCT in the northern and central region of Denmark. Teratoma only patients were not included in the study. RESULTS: 20 patients with iGCT were diagnosed from 2008–2019 in Western Denmark. The cumulative incidence was 1.05 per 100.000. The yearly incidence was 0.1 per 100.000. Mean age at diagnosis was 18 years (range 8–36 years), 17 were males and 3 were females. 13 patients presented with germinoma and 7 patients with non germinomateous germ cell tumours (NGGCT). Three patients had disseminated disease, two with germinoma and one with NGGCT. All patients had received radiotherapy and 18 patients were treated with multidrug chemotherapy including platinum and etoposide before irradiation. Two patients experienced recurrent disease, both non disseminated at diagnosis, one patient with germinoma and one patient with NGGCT. Both received salvage treatment including high dose chemotherapy with stem cell transplantation and reirradiation. Two NGGCT patients died, one patient after development of an anaplastic astrocytoma in the radiation field five years after radiotherapy and one patient after intracranial hemorraghe 18 months after salvage treatment for recurrent disease. Overall survival was 90%, 100% for GCT and 71% for NGGCT. CONCLUSION: The outcome of patients with iGCT in Western Denmark was comparable to the literature. A nationwide study of epidemiology and outcome of iGCT in Denmark is planned.

GCT-66. FINAL REPORT OF THE PROSPECTIVE NEXT/CNS-GCT-4 CONSORTIUM TRIAL (GEMPOX FOLLOWED BY MARROW-ABLATIVE CHEMOTHERAPY) IN PATIENTS WITH REFRACTORY/RECURRENT CNS GERM CELL TUMORS

Margaret Shatara[1], Megan Blue[1], Joseph R. Stanek[1], Allison Y. Liu[2], Diana S. Osorio[1], Mohamed S. AbdelBaki[1], Daniel Prevedello[3], Vinay Puduvalli[3], Pierre Giglio[3], Sharon Gardner[4], Jeffrey Allen[4], Kenneth E. Wong[5], Girish Dhall[6,7], and Jonathan L Finlay[1]; [1]The Division of Hematology, Oncology, Blood and Marrow Transplant, Nationwide Children's Hospital and The Ohio State University, Columbus, OH, USA, [2]University of California-Davis Health, Sacramento, CA, USA, [3]The Ohio State University, Columbus, OH, USA, [4]New York University School of Medicine, New York, New York, USA, [5]Children's Hospital of Los Angeles, Sacramento, CA, USA, [6]The University of Alabama at Birmingham, Birmingham, AL, USA, [7]Children's Hospital of Alabama, Birmingham, AL, USA

BACKGROUND: We report the responses, toxicities and long-term outcomes of gemcitabine, paclitaxel and oxaliplatin (GemPOx) regimen administered, in responsive patients, prior to single cycle marrow-ablative chemotherapy (thiotepa, etoposide and carboplatin) with autologous hematopoietic progenitor cell rescue (HDCx+AuHPCR). METHODS: Since De-